

## WHAT IS CLAIMED IS:

- 1        1.        A method comprising the steps of:
  - 2                a)        dispersing carbon nanotubes in a metal salt solution comprising a  
3                        solvent; and
  - 4                b)        removing the solvent to yield metal salt-treated carbon nanotubes.
- 1        2.        The method of claim 1, wherein the carbon nanotubes are ground into a  
2                powder prior to dispersing them in the metal salt solution.
- 1        3.        The method of claim 1, wherein the metal salt is selected from the group  
2                consisting of alkali metal salts, alkaline earth metal salts, transition metal salts, p-  
3                block metal salts, rare earth metal salts, and combinations thereof.
- 1        4.        The method of claim 1, wherein the metal salt is a cesium salt.
- 1        5.        The method of claim 1, wherein the solvent is water.
- 1        6.        The method of claim 1, further comprising a step of washing the metal salt-  
2                treated carbon nanotubes.
- 1        7.        The method of claim 1, further comprising a step of drying the metal salt-  
2                treated carbon nanotubes.

- 1        8.        A field emission apparatus comprising:
- 2                a)        a low pressure gaseous environment; and
- 3                b)        a cathode comprising:
- 4                        i.        a substrate; and
- 5                        ii.       a metal salt-treated carbon nanotube layer deposited on the
- 6                                substrate.
- 1        9.        The field emission apparatus of claim 8, wherein the metal salt is selected
- 2        from the group consisting of alkali metal salts, alkaline earth metal salts, transition
- 3        metal salts, p-block metal salts, rare earth metal salts, and combinations thereof.
- 1        10.       The field emission apparatus of claim 8, wherein the metal salt is a cesium
- 2        salt.
- 1        11.       The method of claim 8, wherein the metal salt-treated carbon nanotube layer
- 2        comprises a thickness which ranges from about 1  $\mu\text{m}$  to about 10  $\mu\text{m}$ .

- 1       12.     A method for making a field emission cathode comprising the steps of:
- 2             a)     providing a substrate; and
- 3             b)     depositing metal salt-treated carbon nanotubes onto the substrate.
- 1       13.     The method of claim 12, wherein the metal salt-treated carbon nanotubes
- 2       comprise an alkali metal salt.
- 1       14.     The method of claim 12, wherein the metal salt-treated carbon nanotubes
- 2       comprise a cesium salt.
- 1       15.     The method of claim 12, wherein the metal salt-treated carbon nanotubes
- 2       comprise carbon nanotubes selected from the group consisting of single-wall carbon
- 3       nanotubes, double-wall carbon nanotubes, multi-wall carbon nanotubes, carbon
- 4       fibrils, buckytubes, metallic carbon nanotubes, semi-conducting carbon nanotubes,
- 5       semi-metallic carbon nanotubes, chiral carbon nanotubes, chemically-modified
- 6       carbon nanotubes, capped carbon nanotubes, open-ended carbon nanotubes,
- 7       endohedrally-modified carbon nanotubes, and combinations thereof.
- 1       16.     The method of claim 12, wherein the metal salt-treated carbon nanotubes are
- 2       deposited by a technique selected from the group consisting of spraying,
- 3       electrophoretic deposition, dipping, screen-printing, ink-jet printing, dispensing,
- 4       brushing, and combinations thereof.
- 1       17.     The method of claim 12, wherein the metal salt-treated carbon nanotubes are
- 2       deposited by a technique comprising spraying solvent-dispersed metal salt-treated
- 3       carbon nanotubes onto the substrate.
- 1       18.     The method of claim 17, wherein the substrate is heated during the deposition.
- 1       19.     The method of claim 12, further comprising a step of reduction whereby at
- 2       least some of the metal salt is reduced to metal.

- 1        20.     The method of claim 12, further comprising a step of tape activation.